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Talitridae*

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* *In*: Lowry, J.K. & Myers, A.A. (Eds) (2009) Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef, Australia. *Zootaxa*, 2260, 1–930.

Abstract

As a result of the Lizard Island Amphipod workshop (2005) and also as part of samples of the Australia National Talitrid Survey (2003), three species of Talitridae are reported: a neotype is designated for *Chelorchestia limicola* (**comb. nov.**); *Talorchestia spinipalma* is recorded for Australia from observed material, and *Talorchestia terraereginae*, considered for more than 100 years as a junior synonym of *T. spinipalma*, is re-established.

Key words: Crustacea, Amphipoda, Talitridae, Great Barrier Reef, Australia, taxonomy, *Chelorchestia limicola, Talorchestia spinipalma, Talorchestia terraereginae*

Introduction

Talitridae Rafinesque, 1815, is part of the superfamily Talitroidea, which according to Serejo (2004a) also includes three other families – Chiltoniidae J.L. Barnard, 1972, Hyalidae Bulycheva, 1957, and Dogielinotidae Gurjanova, 1953. The family Talitridae includes about 250 species distributed in 52 genera, being the only amphipod group that has colonized terrestrial habitats such as forest floor litter. Talitrids can also be found among decaying material in the supralittoral zone of sand beaches, mangrove swamps and deltas of rivers.

The first studies to describe Australian talitrids were those of Haswell (1879, 1880). Sheard (1937) included 19 species of Talitridae (*sensu lato*, Hyalidae + Talitridae + Chiltoniidae) in his Australian catalogue. More recently, Lowry & Stoddart (2003) catalogued the Australian amphipod fauna and updated our knowledge of the Talitridae. Forty five species of Talitridae were recorded. The first part of the Australian National Talitrid Survey recorded three new genera and eight species of coastal Talitridae, seven of them new to science (Serejo & Lowry 2008). In this paper three species from the Great Barrier Reef are redescribed: *Chelorchestia limicola* (Haswell, 1880); *Talorchestia spinipalma* (Dana, 1852); and *Talorchestia terraereginae* Haswell, 1880. Recently two additional species were identified from Ferriers Creek, Lizard Island: a new species of *Microrchestia* and a previously described species, *Chroestia lota* Marsden & Fenwick, 1986. These were discovered too late to include in this paper, but are included in the interactive keys.

Material and Methods

The descriptions were generated from a DELTA database (Dallwitz 2005) based on the Talitroidea world

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genera and Australian species. Material was hand-collected using 'pooters' (aspirators) and is lodged in the Australian Museum, Sydney (AM) and the Museu Nacional, Universidade Federal do Rio de Janeiro (MNRJ). A set of colour plates, a list of standard abbreviations (except **Ha**, habitus; **Y**, largest male juvenile; **y**, smallest male juvenile) and detailed station data is available in Lowry & Myers (2009). A CD (*Benthic Amphipoda (Crustacea: Peracarida) of the Great Barrier Reef: Interactive Keys*) is available with the book or the keys can be accessed at the www.crustacea.net website.

Talitridae Rafinesque, 1815

***Chelorchestia* Bousfield, 1984**

Diagnosis. See Bousfield (1984).

Remarks. With the transfer of *T. limicola* to *Chelorchestia*, this is the first record of this genus for the Western Pacific region. The five previously known species of *Chelorchestia* were confined to the Americas: *C. darwinii* (Müller, 1864) and *C. forceps* Smith & Heard, 2001 found on the Atlantic side and *C. colombiensis* Valencia & Giraldo, 2009, *C. costaricana* (Stebbing, 1906b) and *C. vaggala* (Bowman, 1977) on the Eastern Pacific side. Bousfield (1984) also suggested the occurrence of *Chelorchestia* from the Eastern Atlantic – Nigeria, although this material has never been described.

Essentially *Chelorchestia* seems to have a Gondwanan distribution and with a consequently old origin, about 100 Ma. Despite the very scarce fossil record of the amphipods, Bousfield (1984) postulated a hypothesis for the evolution of the talitrids, which apparently evolved from a 5-dentate hyalid ancestor by the middle Cretaceous (110-90 Ma). The palustral group, including *Chelorchestia* and four other genera, would be one of the first to evolve as they are very water dependent. By the late Cretaceous (90-70 Ma) the diversification of the flowering plants and rhizophoroid mangrove swamps developed through the coastal tropics and provided suitable habitats for the explosion and colonization of the talitrids – initially in the mangroves and coastlines of the world and latter on invading the litter of the forest by the early Cenozoic time (60 Ma).

***Chelorchestia limicola* (Haswell, 1880) (comb. nov.)**
(Figs 1, 2, Pl. 6E, F)

Talorchestia limicola Haswell, 1880: 98, pl. V, fig. 2. —Stebbing, 1906a: 547. —Stebbing, 1910: 645. —Sheard, 1937: 26. —Springthorpe & Lowry, 1994: 128. —Lowry & Stoddart, 2003: 275.

Type material. Neotype, male, 10.7 mm, AM P80168, Mermaid Cove, Lizard Island, Queensland, Australia (14°38.91'S 145°27.26'E), mangrove roots from mangroves behind beach, intertidal, C. Serejo, 3 March 2005 (QLD 1785).

Additional material examined. 6 males and 33 females, AM P71337 (QLD 1784); 2 males and 2 females, MNRJ (QLD 1784); 1 female, 9.8 mm, AM P80169 (QLD 1785); 1 male and 1 female, AM P71317 (QLD 1785); 3 males and 22 females, AM P71338 (QLD 1785).

Type locality. Mermaid Cove, Lizard Island, Queensland, Australia (14°38'50"S 145°27'14"E), on mangrove roots behind beach.

Description. Based on neotype male, 10.7 mm, AM P80168.

Head. *Head* eye small, round, less than 1/5 head length. *Antenna 1* shorter than peduncle article 4 of antenna 2. *Antenna 2* longer than pereonite 3 and up to half body length; peduncular articles narrow, with sparse, small robust setae, article 5 longer than article 4. *Mandible* left lacinia mobilis 4–dentate. *Maxilliped* palp article 4 reduced.

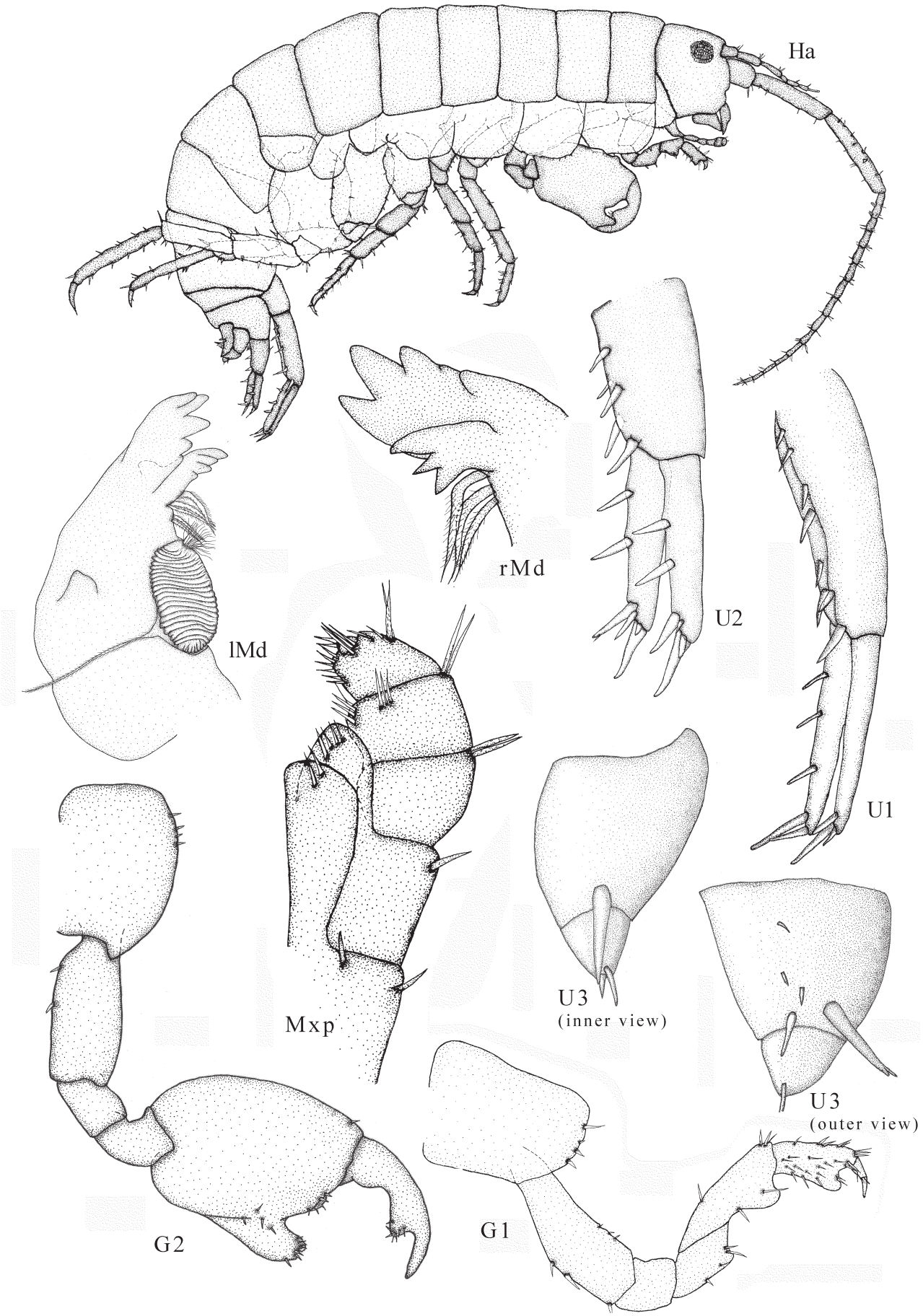

FIGURE 1. *Chelorchestia limicola* (Haswell, 1880), neotype, male, 10.7 mm, AM P80168, Lizard Island, Great Barrier Reef.

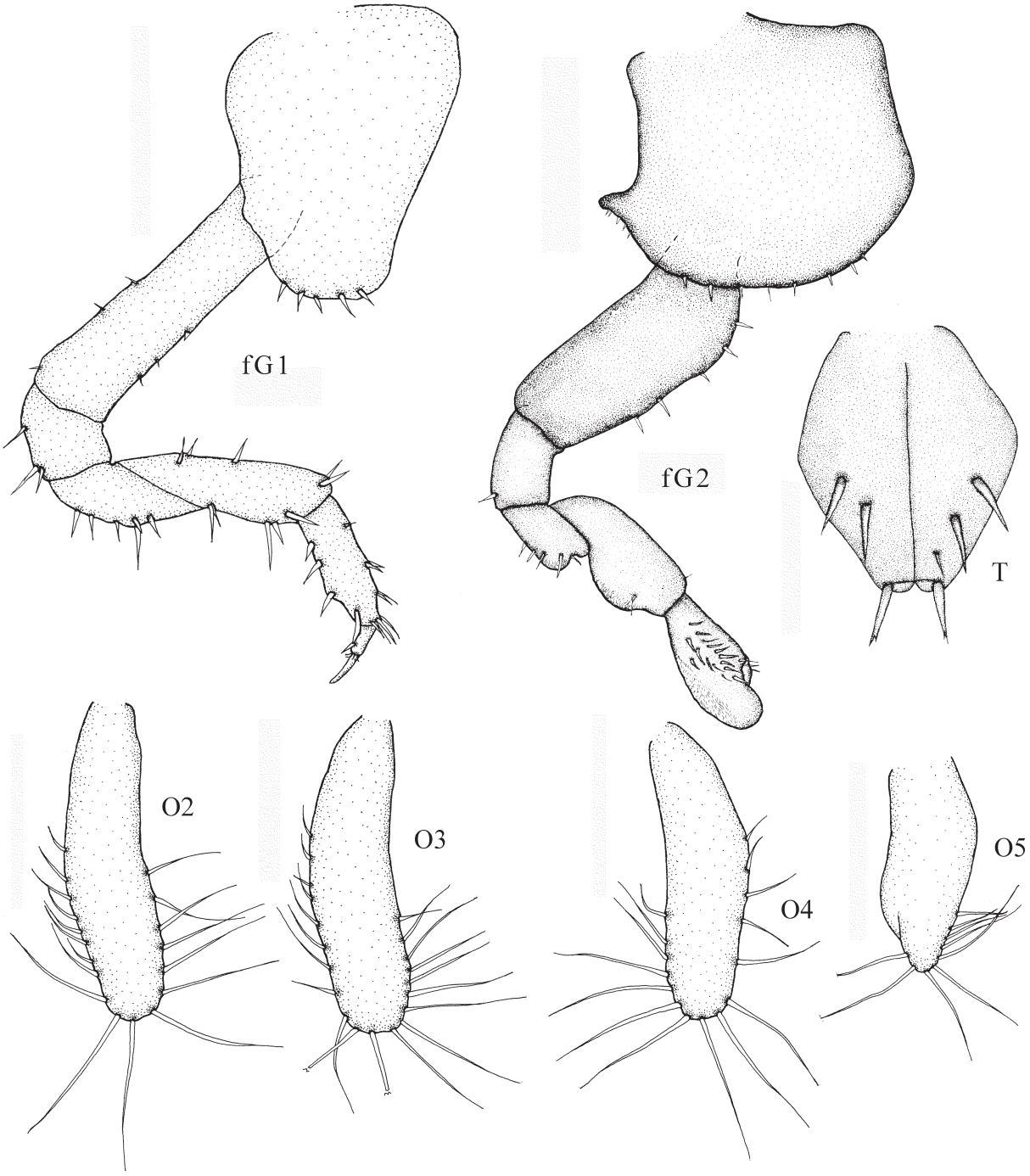

FIGURE 2. *Chelorchestia limicola* (Haswell, 1880), neotype, male, 10.7 mm, AM P80168 (telson); female, 9.8 mm, AM P80169; Lizard Island, Great Barrier Reef.

Pereon. *Coxae 2–4* wider than deep. *Gnathopod 1* sexually dimorphic, subchelate; posterior margin of merus, carpus and propodus with rugose lobe; propodus subrectangular; palm concave; dactylus subequal in length to palm, simplidactylate. *Gnathopod 2* sexually dimorphic, chelate; basis anteriorly smooth; posterior margin of merus and propodus with rugose lobe; carpus indistinct; propodus with two small humps on anterior margin, palm with large midpalmar sinus followed by a large thumb-like bifid process; dactylus fitting palm with well developed process that fits the palmar sinus. *Pereopods 3–7* simplidactylate. *Pereopod 4* slightly shorter than pereopod 3. *Pereopods 3–4* with similar dactyli. *Pereopods 6–7* not sexually dimorphic.

Pleon. *Pleopods 1–3* well developed, peduncles not expanded. *Epimeron 3* posterior margin smooth, without setae, posteroventral corner subquadrate, ventral margin without robust setae. *Uropod 1* peduncle with 5 and 3 robust setae in two rows, distolateral robust seta present, less than 1/4 length of outer ramus; inner ramus subequal in length to outer ramus and with marginal robust setae; outer ramus without robust setae. *Uropod 2* peduncle with 3 and 2 robust setae in two rows, inner ramus subequal in length to outer ramus; inner ramus and outer ramus with 2 marginal robust setae each. *Telson* longer than broad; apical margin incised and with a pair of robust setae, each lobe with 2–3 robust setae.

Female (sexually dimorphic characters). Based on female, 9.8 mm, AM P80169. *Gnathopod 1* posterior margin of merus, carpus and propodus without rugose lobe; palm oblique; dactylus sightly longer than palm. *Gnathopod 2* mitten-shaped; basis narrow; posterior margin of merus, carpus and propodus with rugose lobe; carpus posterior margin distally concave; palm smooth; dactylus shorter than palm. *Oostegites 2–4* oval with 18, 20 and 15 setae. *Oostegite 5* margins convex with 9 setae.

Habitat. The material was found on mangrove roots behind beach, or under the leaf litter from around crab holes at back of beach.

Remarks. *Chelorchestia limicola* was described by Haswell (1880) within *Talorchestia*, but has never been redescribed. Despite the brief description of Haswell (1880), it was possible to identify this species based on the diagnostic male gnathopod 2. The type material is apparently lost (Lowry & Stoddart 2003) and the designation of a neotype, based on material from Lizard Island, is herein proposed as the type locality was originally from Queensland. *Chelorchestia* currently includes five species: *C. costaricana* from mangrove swamps in Costa Rica (Stebbing 1906b); *C. darwini* from mangrove and estuarine areas of the Brazilian coast (Serejo 2004b); *C. forceps* from south-eastern coast of United States; *C. colombiensis* from Palma Island, off the Pacific coast of Colombia found on the littoral fringe zone associated to encrusting and filamentous algae (Valencia & Giraldo, 2009), and *C. vaggala* from San Cristóbal Island (Galapagos Islands) found on litter of altitudes varying from 450 to 600 m (Bowman, 1977).

Chelorchestia limicola is easily identified as a *Chelorchestia* as the male gnathopod 2 is chelate, the outer ramus of uropod 1 lacks setae and the species typically lives in mangroves as most species do. However, the general structure of male gnathopod 2 of *C. limicola* is different when compared with other species of the genus. *Chelorchestia vaggala* is the most different. In the original description a small male (9.4 mm) was described as having a subchelate male second gnathopod with transverse palm (Bowman 1977). However, ontogenetic variation in this appendage suggests that this gnathopod form could be a juvenile stage of a terminal chelate gnathopod (see Smith & Heard 2001), although not yet documented for this species. Considering that the chelate gnathopod is a diagnostic feature for *Chelorchestia* it would important to collect more mature males of *C. vaggala* to confirm its generic status.

Comparing *C. limicola* with the recently described *C. colombiensis*, both have gnathopod 2 propodus not elongated and the thumb-like process is bifid. However, the basis of male gnathopod 2 of *C. limicola* does not have tubercules on the anterior margin; the ischium is not lobate and the proximal hump on palm is also absent. Moreover, the dactylus of *C. limicola* has a better developed process. Compared with the other three *Chelorchestia* species (*C. costaricana*, *C. darwinii* and *C. forceps*), *C. limicola* has the male gnathopod 2 propodus about 1.4 x as long as broad (vs around 2 x as long as broad); and the propodus thumb-like process is thick and bifid, not much extended anteriorly (vs. slender, not bifid and very extended anteriorly, especially in terminal males).

Distribution. *Australia*. Queensland: near Bowen (Haswell 1880); Mermaid Cove, Lizard Island (current study).

Talorchestia Dana, 1852

Diagnosis. See Morino & Miyamoto (1988).

***Talorchestia spinipalma* (Dana, 1852)**
(Figs 3, 4)

Orchestia spinipalma Dana, 1852: 203. —Dana, 1853: 875, pl. 59, fig. 4a–e. –Bate, 1862: 28, pl. 4, fig. 9.
Talorchestia spinipalma. —Stebbing, 1906a: 552 (in part, part =*T. terraereginae*). —Stephensen, 1935: 12. —Schellenberg, 1938: 66. —J.L. Barnard, 1960: 24, figs 7, 8. —Bousfield, 1970: 163. —Morino & Miyamoto, 1988: 95, figs 4–6.
Not *Talorchestia spinipalma*. —Lowry & Stoddart, 2003: 276 (=*T. terraereginae*).

Material examined. Male, 12.4 mm (habitus), AM P69193; male, 13 mm, AM P69188; female, 11.3 mm, AM P69189; 37 specimens, AM P69187 (QLD 839).

Type locality. Tongatapu, Tonga (~21°8'0"S 175°12'0"W).

Description. Based on male, 13 mm, AM P69188.

Head. *Head* eye medium, 1/5–1/3 head length. *Antenna 1* short, not longer than peduncle article 4 of antenna 2. *Antenna 2* more than half body length; peduncular articles narrow. *Mandible* left lacinia mobilis 5-dentate. Maxilliped palp article 2 with mediodistal lobe, article 4 absent.

Pereon. *Gnathopod 1* sexually dimorphic, subchelate; posterior margin of carpus and propodus with rugose lobe; propodus subrectangular; palm transverse and short; dactylus longer than palm. *Gnathopod 2* sexually dimorphic; subchelate; carpus indistinct; posterior margin of propodus with sparse robust setae; palm acute, with two rows of 8 robust setae and a round protuberance near dactylus hinge; dactylus slightly longer than palm and with a correspondence concavity to fit the palm protuberance. *Coxae 2–4* wider than deep. *Pereopods 3–7* cuspidactylate. *Pereopod 4* dactylus thickened and pinched posteriorly, different from pereopod 3 dactylus. *Pereopod 6* shorter than pereopod 7. *Pereopod 7* distal articles slender.

Pleon. *Pleopods 1–3* well developed and biramous. *Epimera 1* anteroventral margin with 7–9 robust setae. *Epimeron 2* subequal in length to epimeron 3. *Epimeron 3* posterior margin smooth, posteroventral corner slightly produced, ventral margin without robust setae. *Uropod 1* peduncle with two rows of 15 and 10 setae, distolateral robust seta absent; inner ramus subequal in length to outer ramus with two rows of 6-9 marginal robust setae; outer ramus without robust setae. *Uropod 2* inner ramus subequal in length to outer ramus; inner ramus with two rows of 5 marginal robust setae. *Uropod 3* ramus half of peduncle with marginal and apical robust setae. *Telson* longer than broad; apically incised; dorsal midline entire; with marginal and apical robust setae; with 10–12 robust setae per lobe.

Female (sexually dimorphic characters). Based on female, 13 mm, AM P69189. *Gnathopod 1* simple; posterior margin of merus, carpus and propodus lacking rugose lobe. *Gnathopod 2* mitten-shaped; basis expanded, about 2 x longer than wide, with several robust setae along anterior margin; posterior margin of merus and propodus with rugose lobe; dactylus shorter than palm. *Oostegites 2–5* oval with few marginal setae.

Remarks. Dana (1852, 1853) described *T. spinipalma* based on few and unclear illustrations. Later, this species was properly illustrated by J.L. Barnard (1960) based on material from Micronesia. Bousfield (1970) recorded *T. spinipalma* from Rennell Island making only few comments on the females, and no illustrations. The records of *T. spinipalma* for Australia has been always based on Stebbing´s (1906a) synonymy, where he stated that *T. terraereginae* described by Haswell (1880) for Queensland was a junior synonym of *T. spinipalma*. In fact, the syntype series of *T. terraereginae* was observed and proved to be a valid species. Therefore, this is a first record of *T. spinipalma* for Australia based on observed material. Diagnostic characters pointed out in Table 1 for *T. spinipalma* were observed and illustrated based on the Australian material, which confirms its identification. Morino & Miyamoto (1988) redescribed *T. spinipalma* with material from Papua New Guinea and New Caledonia and compared it with the close species *T. palawanensis* Morino & Miyamoto, 1988 from Palawan Island, Philippines. However, with the observation of the type series of *T. terraereginae* it became clear that *T. palawanensis* is a junior synonym of the former as will be discussed in details below. Differences between these species can be found in Table 1.

Table 1. Morphological characters distinguishing *T. spinipalama* and *T. terraereginae* (modified from Morino & Miyamoto 1988).

	T. spinipalma	*T. terraereginae*
carpus of male gnathopod 2	indistinct	distinct
propodus of male gnathopod 2	posterior margin subequal to palmar length	posterior margin about half of palmar length
dactylus of pereopod 4	more elongate with distinct bump proximally	shorter, bump not so distinct
epimera 1 anteroventral margin	with 7–9 robust setae (4–6 in female)	with 3–6 robust setae
uropod 1 distolateral robust setae	absent	present

FIGURE 3. *Talorchestia spinipalma* (Dana, 1852), male, 12.4 mm, AM P69193, Port Douglas, Queensland.

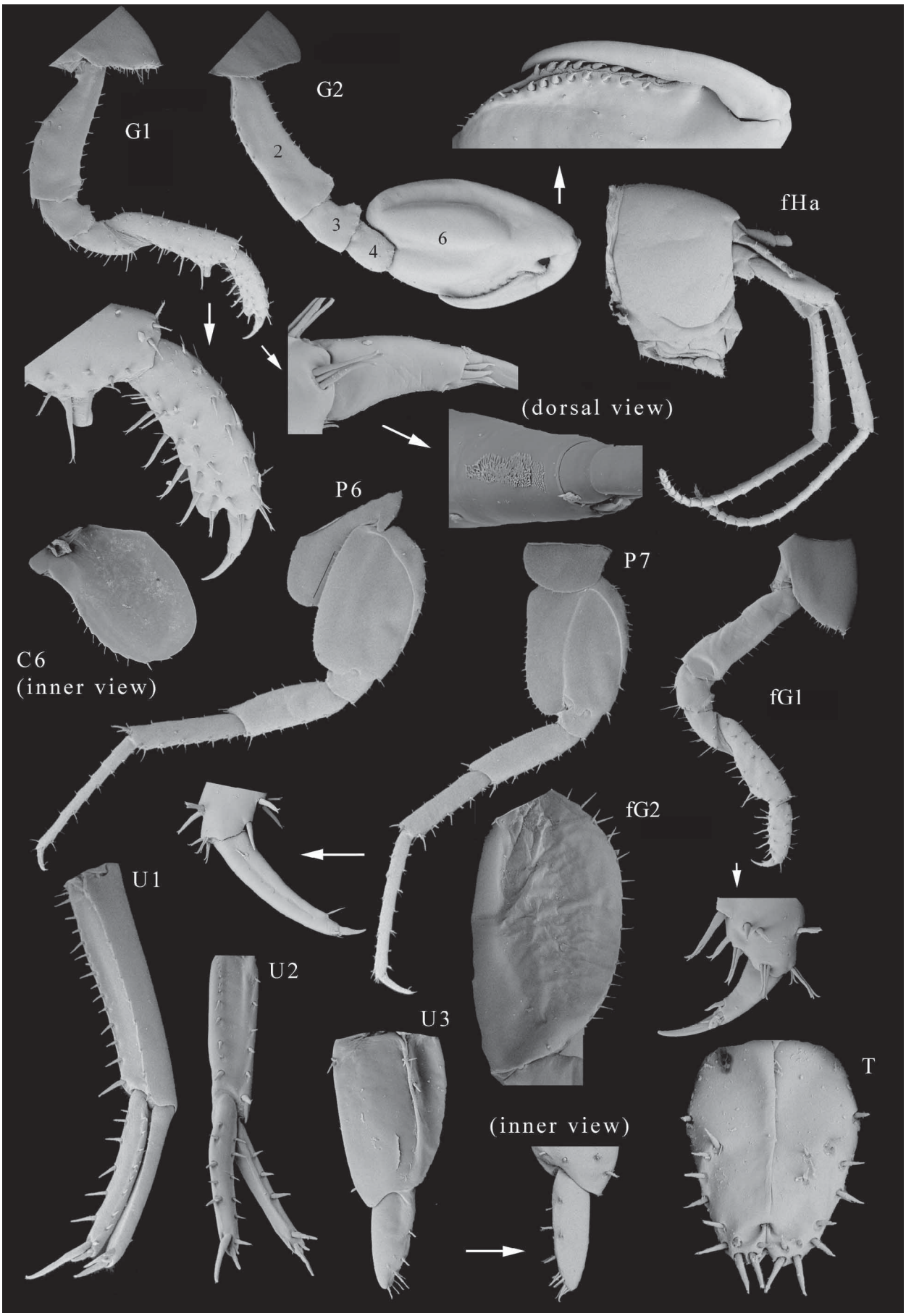

FIGURE 4. *Talorchestia spinipalma* (Dana, 1852), male, 13 mm, AM P69188; female, 11.3 mm, AM P691189; Port Douglas, Queensland.

Distribution. *Australia*. Queensland: Port Douglas (current study). *Micronesia*. (J.L. Barnard 1960). *New Caledonia*. Île des Pins and Nouméa (Morino & Miyamoto 1988); *Papua New Guinea*. Bismarck Archipelago (Schellenberg 1938); Motupore Island (Morino & Miyamoto 1988). *Philippine Islands*. (Schellenberg 1938). *Solomon Islands*. Ghizo Island (Morino & Miyamoto 1988); Rennell Island (Bousfield 1970). *Tonga*. Tongatapu (Dana 1852).

Talorchestia terraereginae Haswell, 1880

(Fig. 5, Pl. 6G)

Talorchestia terrae-reginae Haswell, 1880: 98, pl. V, fig. 4 (including fig. 2g male on the middle right of the plate, which is labeled as fig. 2).
Talorchestia spinipalma. —Stebbing, 1906a: 552 (in part). —Lowry & Stoddart, 2003: 276.
Talorchestia palawanensis Morino & Miyamoto, 1988: 93, figs 1–3.

Type material. Lectotype, male, 12.9 mm, AM P69180, Port Denison, Queensland, Australia (~20°2'00"S 148°15'00"E), on sandy beach. Paralectotypes: 1 female, 14.2 mm, AM P69181; 2 males, 9.5 mm and 12.4 mm, 9 females AM P3415, same data as lectotype.

Additional material examined. 1 juvenile male, 10.4 mm; 1 female, 8.2 mm; AM P71060 (QLD 1722). 8 males (larger males 13.5 – 13.7 mm) and 11 females (ovigerous, 9.4 – 9.8 mm), AM P71121; 2 males and 2 females, MNRJ; (QLD 1722).

Type locality. Port Denison, Queensland, Australia (~20°2'00"S 148°15'00"E), on sandy beach.

Description. Based on lectotype, male, 12.9 mm, AM P69180.

Head. *Head* eyes oval to subsquare (dorsal and ventral margins truncate), medium in size, 1/5–1/3 head length. *Antenna 1* short, not longer than peduncle article 4 of antenna 2. *Antenna 2* reaching end of pereonite 4 (seen in the animal, not dissected); peduncular articles narrow, articles 4 and 5 very long. *Mandible* left lacinia mobilis 5-dentate. *Maxilliped* palp article 2 with mediodistal lobe, article 4 absent.

Pereon. *Gnathopod 1* sexually dimorphic; subchelate; posterior margin of carpus and propodus with rugose lobe; propodus subrectangular; palm transverse and short; dactylus longer than palm. *Gnathopod 2* sexually dimorphic; subchelate; carpus distinct; posterior margin of propodus half of palmar length and lacking robust setae; palm acute, with a row of 7 robust setae and a round protuberance arcuate anteriorly near dactylus hinge; dactylus subequal in length to palm with a correspondence concavity to fit the palm protuberance. *Coxae 2–4* wider than deep. *Pereopods 3–7* cuspidactylate. *Pereopod 4* short, reaching end of pereopod 3 merus; dactylus thickened and pinched posteriorly. *Pereopod 6* shorter than pereopod 7, coxa angles rounded with about 10 marginal setae.

Pleon. *Pleopods 1–3* well developed and biramous. *Epimeron 1* anteroventral margin with 4 robust setae. *Epimeron 2* subequal in length to epimeron 3. *Epimeron 3* posterior margin smooth, posteroventral corner slightly produced, ventral margin without robust setae. *Uropod 1* peduncle with two rows of 10 and 6 setae, distolateral robust seta present; inner ramus subequal in length to outer ramus with two rows of 4-6 marginal robust setae; outer ramus without robust setae. *Uropod 2* inner ramus subequal in length to outer ramus; both rami with 4 marginal robust setae. *Uropod 3* ramus about 60% of peduncle length with marginal and apical robust setae. *Telson* longer than broad, apically incised with marginal and apical robust setae, about 10–12 robust setae per lobe; dorsal midline entire.

Female (sexually dimorphic characters). Based on paralectotype, female, 14.2 mm, AM P69181. *Gnathopod 1* simple; posterior margin of merus, carpus and propodus lacking rugose lobe. *Gnathopod 2* mitten-shaped; basis expanded, about 1.7 x longer than wide; posterior margin of merus and propodus with rugose lobe.

Variations. Juvenile males (9.1–11.0 mm) with antennae 2 reaching the end of pereonite 2 (seen in the animal, not dissected). Gnathopod 2 with palmar protuberance not arcuate anteriorly.

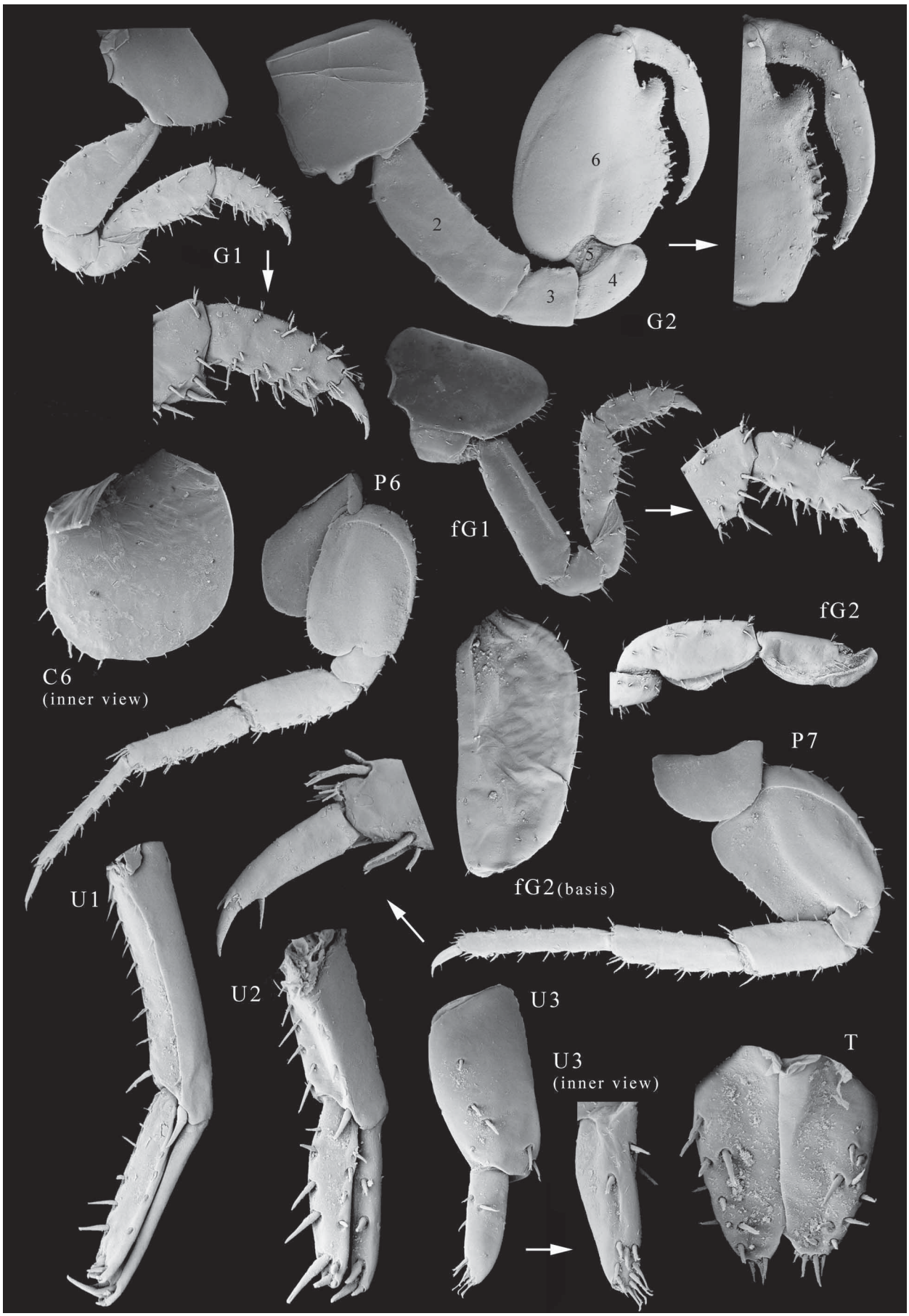

FIGURE 5. *Talorchestia terraereginae* Haswell, 1880, lectotype, male, 12.9 mm, AM P69180, Port Denison, Queensland.

Remarks. Since the work of Stebbing (1906a) *T. terraereginae* has been considered as a junior synonym of *T. spinipalma* as the former species was poorly described and illustrated. Study of the syntype series of *T. terraereginae* deposited in the Australian Museum, revealed important diagnostic characters that clearly distinguished this species from *T. spinipalma* as indicated in Table 1, and showed that *T. terraereginae* is a senior synonym of *T. palawanensis*. Morino & Miyamoto (1988) found some specimens of *T. terraereginae* (treated as *T. palawanensis*) at Thursday Island, Australia and pointed some variations between the population from Philippines and Australia. However, as these authors stated, these differences were all size related as observed with the *T. terraereginae* population herein described. An exception is the eye shape described as "more variable and some are much broader than deep" for the Thursday Island population (Morino & Miyamoto 1988). This variation in the eye shape was not observed in the present material, they all have a subsquare shape and the dorsal and ventral margins are truncate.

Distribution. *Australia*. Queensland: Thursday Island, Torres Strait (Morino & Miyamoto 1988); Port Denison (current study); Palfrey Island, Lizard Island (current study). *Philippine Islands*. Palawan Island (Morino & Miyamoto 1988).

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